

LIP SEAL FOR ROLLER CONE DRILL BIT

Abstract

The present invention is generally directed to various embodiments of a radial lip seal for use with roller cone drill bits. In one illustrative embodiment, a drill bit is disclosed that is comprised of a spindle, a rolling cutter positioned around the spindle, the rolling cutter having a seal recess formed therein, the seal recess having an outer surface, and a lip seal positioned in the seal recess and around the spindle, wherein at least one void is intentionally established between the outer surface of the seal recess and the outer surface of the lip seal. In another illustrative embodiment, the method comprises providing a drill bit comprised of a spindle, a rolling cutter positioned around the spindle, the rolling cutter having a seal recess formed therein, the seal recess having an outer surface, and a lip seal positioned in the seal recess and around the spindle, wherein at least one void is intentionally created between the outer surface of the seal recess and the outer surface of the lip seal. The method further comprises positioning the drill bit in a well bore, wherein the at least one void is at least partially collapsed when the drill bit is subjected to

hydrostatic pressure in the well bore, and performing drilling operations with the drill bit.